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FEE TRANSMITTAL
For FY 2005

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT ($) 500.00

Complete if Known	
Application Number	09/685,052
Filing Date	November 6, 2000
First Named Inventor	Brian Wesley Damon
Examiner Name	Thompson, James A
Art Unit	2624
Attorney Docket No.	LE9-99-149

METHOD OF PAYMENT (check all that apply)

☐ Check ☐ Credit Card ☐ Money Order ☐ None ☐ Other (please identify): ______

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FEE CALCULATION

1. BASIC FILING, SEARCH, AND EXAMINATION FEES

Application Type	FILING FEES Fee ($)	FILING FEES Small Entity Fee ($)	SEARCH FEES Fee ($)	SEARCH FEES Small Entity Fee ($)	EXAMINATION FEES Fee ($)	EXAMINATION FEES Small Entity Fee ($)	Fees Paid ($)
Utility	300	150	500	250	200	100	
Design	200	100	100	50	130	65	
Plant	200	100	300	150	160	80	
Reissue	300	150	500	250	600	300	
Provisional	200	100	0	0	0	0	

2. EXCESS CLAIM FEES

Fee Description	Fee ($)	Small Entity Fee ($)
Each claim over 20 (including Reissues)	50	25
Each independent claim over 3 (including Reissues)	200	100
Multiple dependent claims	360	180

Total Claims ______ - 20 or HP = **Extra Claims** ______ x **Fee ($)** ______ = **Fee Paid ($)** ______

HP = highest number of total claims paid for, if greater than 20.

Indep. Claims ______ - 3 or HP = **Extra Claims** ______ x **Fee ($)** ______ = **Fee Paid ($)** ______

HP = highest number of independent claims paid for, if greater than 3.

Multiple Dependent Claims **Fee ($)** ______ **Fee Paid ($)** ______

3. APPLICATION SIZE FEE

If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

Total Sheets ______ - 100 = **Extra Sheets** ______ / 50 = **Number of each additional 50 or fraction thereof** ______ (round **up** to a whole number) x **Fee ($)** 250.00 = **Fee Paid ($)** 0.00

4. OTHER FEE(S) **Fees Paid ($)**

Non-English Specification, $130 fee (no small entity discount) ______

Other (e.g., late filing surcharge): Appeal Brief 500.00

SUBMITTED BY

Signature	John A. Brady	Registration No. (Attorney/Agent)	22,020	Telephone	859-232-4785
Name (Print/Type)	John A. Brady			Date	Nov. 10, 2005

AP
IFW

PATENT

IN THE UNITED STATEDS PATENT AND TRADEMARK OFFICE

In re application of

Brian Wesley Damon et al. **November 10, 2005**

Serial No.: **09/685,052** Group Art: **2624**

Filed: **November 6, 2000** Examiner: **Thompson, James A.**

Title: **Method of Compensating for Electronic Printhead Skew and Bow Correction in an Imaging Machine to Reduce Print Artifacts**

Mail Stop Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPEAL BRIEF

Before the Board of Appeals and Interferences

In response to the Final Rejection mailed September 13, 2005, please enter this Appeal Brief.

TABLE OF CONTENTS

REAL PARTY IN INTEREST

The real party in interest is Lexmark International, Inc., a corporation of the state of Delaware, which owns the entire interest in this patent application and the underlying invention.

RELATED APPEALS AND INTERFERENCES

There are no related appeals, or interferences, or judicial proceedings which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision in this pending appeal.

STATUS OF CLAIMS

Claims 1, 2, 4, 5, 6, 9, 11, 12, 14, 15, 17, 18, and 19 are presently rejected, and are the subject of this appeal. The original claims numbered 1 through 16, claims 17-19 were added and claims 3, 7, 8, 10, and 13 were cancelled before the outstanding Final **Rejection.**

STATUS OF AMENDMENTS

No amendment after the instant final rejection was submitted. No amendment is outstanding for action.

SUMMARY OF CLAIMED SUBJECT MATTER

Most of the pending claims are directed to modifying distortion incident to skew correction when the image data is modified by a halftone screen. A halftone screen provides shade variations by turning on only a certain percentage of pels in a limited area. A corresponding dot in the halftone bitmap is turned on only if the data tone value exceeds the threshold value. The human eye perceives the resulting printed and unprinted pels as an image of varying lightness depending on the percentage of pels printed. (This integration of the pattern of dots by the eye is not expressly stated in the specification, but is widely familiar in the form of photographs which commonly appear in newspapers.)

U.S. Patent No. 4,556,918 to Yamazake et al. is a teaching of one type of embodiment of a halftone screen, as well as having teachings of other variations in its introduction. This patent was cited in the last amendment filed as a state-of-the-art document confirming that a halftone screen is not inherent in any color printing. (A primary point of contention in this prosecution is believed to be the examiner's position that a teaching of deskewing of printing of multiple colors with no mention of halftoning or continuous tone or the like, nevertheless inherently employs a halftone screen.)

Deskewing is described in considerable detail in the specification from page 3, line 24 to page 8, line 7. Deskewing involves modifying the image bitmap (not the halftone screen bitmap) so that pels of a skewed scan line are moved to adjoining lines in proportion to the amount of the skew of the pels. Further details of deskewing are not believed relevant to this appeal as none of the claims are to deskewing per se. The primary reference cited by the examiner, U.S. Patent No.5,719,680 to Yoshida et al., does employ deskewing corresponding to the deskewing of the claims.

As the addition of discussion of the dependent claims is not lengthy and is believed to add t overall clarity, both the independent and dependent claims are discussed in this section. Each is clearly identified as independent or dependent.

Claim 1 is an independent claim to deskewing and then applying the halftone screen to reduce distortion which would be induced if the halftone screen were applied first. This is a generic claim supported by the embodiment described on page 9, lines 7 through 32 and illustrated in Fig. 5 as a flow chart. That embodiment is to printing multiple colors, and is claimed more specifically in claim 3 as discussed below.

Claim 2 is dependent on claim 1 and is directed to preventing a single character of text from being subject to the shifting effects of two skew correction factors. The description of the corresponding embodiment is found at page 10, lines 1 through 25 and illustrated in Fig. 6 as a flow chart. A vertical centerline of each text character is identified and the text character is associated with one of the blocks for skew correction spanning the width of the bit maps (page 10, lines 16-18). The entirety of each character is shifted by the skew correction factor associated with the associated block (page 10, lines 18-20). This claim describes the identified characters as "characters which bridge" adjoining blocks.

Claim 4 is an independent, somewhat specific claim directed the embodiment described on page 9, lines 7 through 32 and illustrated in Fig. 5 as a flow chart. Continuous tone (or contone) data is not specifically defined, but is widely understood as data containing lightness information. The definition of continuous tone is not believed to be in issue in this prosecution. In fact, the examiner's rejection of claim 3 assumes that the data of the reference cited (Yoshida) is continuous tone data, which is not agreed.

Claim 5 is essentially similar to claim 2, but is dependent on claim 3. It is supported in the specification on the same disclosure as is claim 2.

Claim 6 is an independent claim closely similar to claim 5 which does not have the halftone screen limitation but which describes the color information as continuous tone data, and requires generation of bytemaps from that data. Bytemaps are employed with halftone screens to describe shade variations. This is described at page 8, lines 14-17 which read: "During halftoning, a halftone grid is made to overlay the image plane of contone data, i.e., bytemap, of interest to effective generate a halftoned bit map of the image plane of interest, so as to allow for shade variations of the color by turning on only a certain percentage of the total number of pels." The other elements of the claim are closely similar to claim 5.

Claim 9 is an independent claim to the pre-compensation alternative. The pre-compensation shifts the halftone screen to compensate for the skew, applies the shifted halftone screen first, and then conducts the skew correction. This is described at page 10, line 26 through page 11, lines 19. Much of the terminology and content is as discussed in the foregoing for earlier claims. The shifting of the halftone is in a direction reverse to and at a magnitude equal to the direction of the electronic skew correction which is to be supplied to the bit map (page 11, lines 3-8).

Claim 11 is an independent claim requiring identifying the centerline of characters (instead of the broader "characters which bridge" of claims 2, 5 and 6) and requiring skew correction. Claim 11 otherwise is closely similar to claim 6. Identifying the centerline is found in the supporting embodiment (page 10, line 16).

Claim 12 is dependent on claim 11 and adds the step of applying a halftone screen.

Claim 14 is an independent claim to applying a pre-compensated halftone screen to image data for at least one of a plurality of image planes and then applying skew correction. This is a generic claim based on the description which supports claim 9.

Claim 15 is dependent on claim 14 and describes somewhat broadly the subject matter of page 10, lines 1-25 and Fig. 6, S210 to S216, which are directed to preventing a single character of text from being subject to the shifting effects of two skew correction factors.

Claim 17, 18, and 19 are dependent claims on claims 2, 5, and 6, respectively to provide for shifting all of the character located in adjoining blocks. Claims 2, 5, and 6 are written broadly so as to permit only part of such a character to be shifted, which may be less desirable, but might be used to avoid the claims. Claim 17, 18 and 19 provide a range of coverage by providing that all of such characters are shifted.

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 1, 4, 9 and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Yoshida (US Patent 5,719,680).

Claims 2, 5-6, 15 and 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida (US Patent 5,719,680) in view of Cullen (US Patent 5,854,854) and Kamitani (US Patent 6,327,385 B1).

Claims 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida (US Patent 5,719,680) in view of Cullen (US Patent 5,854,854) and Saund (US Patent 5,835,241).

No other rejection or objection is outstanding.

ARGUMENT

The Yoshida Reference

The Official Action rejects all of the claims by applying the Yoshida reference as the primary reference. Therefore the applicability of the Yoshida reference will be addressed here before addressing the individual rejections.

The undersigned finds no reference at all in Yoshida to the printing being applied as modified by a screen. The word "screen" does not appear in Yoshida, nor the words "continuous tone" or "contone" or "byte" or "bytes" or "bytemap" or "bytemaps." The rejections states that Yoshida prints with a screen, but the citations to Yoshita for that are to descriptions of printing one line over another line. The final pattern shown is suggestive of a rectangle (Fig. 5 of Yoshita).

The rejection further states that use of a halftone screen is inherent in applying data to a printhead. Even assuming some screen is used or inherent in Yoshita, it surely is not the screen described and claimed in this application. As the claims expressly state, the screen is a halftone screen. As stated at page 8, lines 14 to 21 of the specification, halftoning involves allowing for shade variations by turning off only a certain percentage of pels by comparing the data for each pel or pixel to a value contained in the halftone grid.

Halftoning has a wide number of variations, and the modern screen typically is conceptual pattern, not physical hardware. United States Patent No. 4,556,918 to Yamazake et al. is a teaching of one type of embodiment, as well as having introductory teachings of other variations. This patent clearly illustrates generating screened halftone images (although the embodiment is for saving memory. which is presumably unimportant today in view of advances in electronics).

Each minute cell in a picture region in the foregoing patent 4,556,918 is given a predetermined number. Those numbers vary from large to small in a predetermined pattern.

Those numbers are compared to the number in image data from the same picture area. Image data corresponding to each cell is given a density number. If the image density number is larger than the corresponding cell number, that area of image data is printed. This results in predetermined patterns of printed elements which vary with the intensity of the overall region being depicted by the printing.

Examples of the halftone dot pattern obtained are shown in Figures 5A and 5B of the patent. See column 6, lines 57-65. The patterns for a video [density] signal having a value of 68 of a possible high of 255 is shown in Figure 5A. Figure 5A shows two somewhat irregular solid areas spaced diagonally from one another. The pattern for a video [density] signal having a value of 240 of a possible high of 255 is shown in Figure 5B. Figure 5B shows a large solid square with two, small somewhat irregular white areas spaced diagonally from one another.

Thus, even assuming that Yoshida teaches or suggests a screen, nothing suggests such a screen is as specialized as a halftone screen.

Correcting the skew of a printhead does not necessarily involve a halftone screen. Where the printing is not to have shades of gray or shades of color, a halftone screen is simply not involved. When two subtractive colors are printed one on the other, a different color is achieved. As discussed in more detail below, Yoshida simply discloses printing magenta over yellow in the same pattern. This produces red. Thus, Yoshida only suggests printing an image in one color and is not to printing in shades of colors.

That yellow and magenta are such subtractive colors is widely understood. U.S. Patent No. 3,057,770 to Hayford et al. reads at column, lines 10 through 16 read: "According to this subtractive system, a magenta-colored material is characterized by a substantially complete absorption of the primary color, green, and thus may be designated as green-negative; cyan material is characterized by substantially complete absorption of the color red, and a yellow material is characterized by substantially complete absorption of the primary color blue."

The only explicit statement in Yoshida as to what is being printed is a statement indicating that yellow printing and magenta printing are to be in similar patterns, which yields red color. That red covers all parts of the pattern to be displayed, and is not in shades of red unless the pattern is that of a halftone. The Yoshida statement is found at column 2, lines 65 to 67, which read: "The white circles on the paper represent dots printed by the preceding yellow head 43." Followed at column 3, lines 4 to 5 which read: "The magenta image consists of similar image lines." These statements are about Fig. 5, which suggests a rectangle of dots, not a halftone pattern .

Finally, even if Yoshida included halftoning, which it does not, it certainly does not address reducing artifacts resulting from halftoning. Yoshida is only about deskewing. This specification apparently has complete novelty to teaching when and how to use halftone screening to reduce undesirable print artifacts.

Rejection of Claims 1, 4, 9 and 14 as Anticipated

Claim 1

Claims 1 and 4 are directed to applying the skew correction and then applying the halftone screen. This argument is directed to claim 1 because the rejection of claim 4 is on a much different basis than the rejection of claim 1. With respect to claim 1 no issue is taken with the parts of the rejection as follows: applying electronic skew correction to image data, corresponding to at least tone of a plurality of image planes, to generate skew corrected image data. The rejection goes on to find that Yoshida applies a halftone screen by applying a yellow halftone screen and also by applying a magenta halftone screen.

As discussed in the foregoing detailed discussion of Yoshida, nothing in Yoshida is suggestive of a halftone screen. The yellow data of Yoshida must be simply image data and the magenta data also must be image data. If not, Yoshida would be about something Yoshida never suggests, which is printing with degrees of lightness.

This lack of a halftone screen fully distinguishes Yoshida with respect to anticipation of claims 1 and 4. Additionally, the rejection is fully overcome by lack of printing a halftone screen after the skew correction. These claims clearly require skew correction followed by application of the halftone screen. The rejection finds in Yoshida a combined pattern and halftone screen. Thus, on a second basis, the rejection does not constitute a finding in Yoshida of the required elements of first deskewing and then applying a halftone screen.

Claim 4

No issue is taken with the part of the rejection finding in Yoshida a plurality of printheads, each corresponding to an image plane, and to a respective printhead, to applying skew correction, and to serializing the data.

However, claim 4 requires receiving continuous tone data. The rejection cites column 2, lines 17-19 of Yoshida for this. That reads: "Data to be supplied to printhead 1 are stored in an image data memory 5, which stores data for a certain number of consecutive image lines." That does not specify continuous tone data. The data may be simply that of an image, without shades of lightness. Similarly, claim 4 requires generating bytemaps. The rejection cites column 2, lines 12-14 and 17-18 of Yoshida for this. The lines 12-14 read: "Each printing head 1 comprises a plurality of driving elements 2 and a like plurality of image-forming elements 3." The lines 17-18 read: "Data to be supplied to printing head 1 are stored in an image data memory, which stores data for a certain [end of line 18]". These statements are entirely consistent with the data being image data, not image with degrees of lightness data. The word "byte or "bytemap" or "bytemaps" does not appear in Yoshida.

This rejection expressly finds that printing with a halftone screen applied is inherent in the teaching of column 3, lines 16-18 of Yoshita, which read: "The dot data for each image line can be divided into three-dot portions K_1 to K_8 which are supplied to corresponding part so the LED head." This is not suggestive of a halftone screen. The data of Yoshida must be

simply image data. If not, Yoshida would be about something Yoshida never suggests, which is printing with degrees of lightness.

The response prior to the current final rejection asked for some teaching or authority that is inherent in applying data to a printhead. Apparently in response to that the Final Rejection at pages 5-8 newly cited three patents and one publication. Of these:

U.S. Patent No. 5,841,458 to Kroon is directed virtually entirely to halftone screen implementations, but at column 1, 59-64 lines it states that "solid fill" printing is acceptable for most test [sic] and graphics printing applications not requiring "photographic" image quality. The rejection cites at length column 1, lines 11-29 of Kroon, which merely describes laser scanning operation.

U.S. Patent No. 5,748,330 to Wang et al. is to calibrating a printer and, moreover, states at column 1, lines 35-45 that controlling the distribution of dots to obtain the illusion of continuous tones can be classified as either "halftone screen" techniques in which small dots are accumulated or "error diffusion" in which a dot at a location is used to derive an error signal, which is then spatially distributed in the neighborhood of the dot. The existence of the error diffusion alternative makes clear that use of a halftone screen is not inherent in printing in general.

U.S. Patent No. 5,497,180 to Kawakami et al. is to improved error diffusion, not to use of a halftone screen.

The *Principles of Color Technology* publication by Roy S. Berns is cited in the rejection for portions describing printing dots in regular grids for halftoning. The does describe halftoning, but not by halftone screen and with no suggestion that images necessarily are printed halftoned.

Accordingly, in summary with respect to claim 4, Yoshida does not teach the continuous tone claimed, the bytemap claimed, nor the halftone screen application claimed. Lack of any one of these overcomes the anticipation rejection.

Claim 9

Claims 9 and 14 are to the pre-compensated halftone screen alternative. This argument is directed to claim 9 because the rejection of claim 14 is on a much different basis than the rejection of claim 9. As stated with respect to claim 4, no issue is taken with the part of the rejection finding in Yoshida a plurality of printheads, each corresponding to an image plane, and to a respective printhead, to applying skew correction, and to serializing the data.

However, claim 4 requires receiving continuous tone data. The rejection cites column 2, lines 17-19 of Yoshida for this. That reads: "Data to be supplied to printhead 1 are stored in an image data memory 5, which stores data for a certain number of consecutive image lines." That does not specify continuous tone data. The data may be simply that of an image, without shades of lightness. Similarly, claim 9 requires generating bytemaps. The rejection cites column 2, lines 12-14 and 17-18 of Yoshida for this. The lines 12-14 read: "Each printing head 1 comprises a plurality of driving elements 2 and a like plurality of image-forming elements 3." The lines 17-18 read: "Data to be supplied to printing head 1 are stored in an image data memory, which stores data for a certain [end of line 18]". These statements are entirely consistent with the data being image data, not image with degrees of lightness data. The word "byte or "bytemap" or "bytemaps" does not appear in Yoshida.

As in the rejection of claim 4, this rejection expressly finds a halftone screen as being inherent in Yoshida. This is clearly not supported for the reasons discussed in detail in the preceding discussion of the rejection of claim 4.

The rejection of claim 9 then goes on to find shifting of the starting point of the halftone screen in the skew correction described by Yoshida. Since Yoshida does not teach a

halftone screen, the teaching of skew correction is Yoshida is simply a teaching of skew correction of an image and could not be a teaching of the shifting of a starting point of application of a halftone screen.

Claim 14

This rejection applies the yellow data of Yoshida as a pre-compensated halftone screen. No issue is taken with the application of the magenta image as skew corrected. As discussed in the foregoing detailed discussion of Yoshida, nothing in Yoshida is suggestive of a halftone screen. The yellow data of Yoshida must be simply image data and the magenta data also must be image data. If not, Yoshida would be about something Yoshida never suggests, which is printing with degrees of lightness. The claim requirement of applying a pre-compensating a halftone screen not only requires a teaching of a halftone screen, which Yoshida does not have, but also requires a teaching of pre-compensating a halftone screen which Yoshida does not have.

Moreover, if the yellow data is the pre-compensated screen, then to anticipate claim 14 it should be applied to the magenta of Yoshida prior to skew correction. Instead, the magenta is simply skew corrected to apply over the yellow.

Accordingly, in summary with respect to claim 14, Yoshida does not teach a pre-compensated halftone screen as claimed and does not teach applying the pre-compensated halftone screen to image data prior to skew correction as claimed. Lack of either of these overcomes the anticipation rejection.

<u>Rejection of Claims 2, 5-6, 15 and 17-19 as Obvious</u>

Claims 2, 5, 15 and 19

Claims 2, 5, 15 and 19 depend directly from independent claims discussed in the foregoing. The rejections do not further elaborate on the Yoshida reference as applied in the rejections of the independent claims, but merely cite other references for subject matter said

not to be found in Yoshida. Accordingly, allowance of the independent claim from which each depends, renders these claims also patentable. Claims 17 and 18 depend from claim 2 and 5 and are similarly patentable.

Claims 2, 5-6, 15 and 17-19

This argument is applicable to independent claim 6 and as a second and independent reason for allowance of claims 2, 5, 17-19. With respect to claims 2, 5 15, and 17-19, all dependent claims, the rejections do not further elaborate on the Yoshida reference as applied in the independent claims from which they depend. The rejection of claim 6, an independent claim, applies Yoshida as receiving continuous tone data and for generating a plurality of bytemaps. For the reasons discussed in the foregoing with respect to claim 4, Yoshida does not disclose continuous tone data or generating a plurality of bytemaps. No issue is taken with the other characterizations of Yoshida with respect to claim 6.

Cullen is cited for associating text characters with blocks and correcting skew by shifting separate blocks. Kamitani is cited for identifying text characters which adjoin each other and associating each character with a respective portion.

Such application of Cullen cannot stand because Cullen does not teach preserving individual characters. As shown in Figure 2c of Cullen and stated at column 5, lines 6 - 21, the scanned document is first compressed. The compression of Cullen is the logical OR result of neighboring data in which a single black in the OR operation renders the result black (col. 6, line 40 – col. 7, line 13). Figure 3 of Cullen is illustrative. Black in any pel location in lines 300-303 produces black, as shown in 312. Similarly, in Figure 5 of Cullen, lines 501 and 502 create rectangle 530, which is bounded only when the data in both lines are white. Rectangle 522 is defined by black 515 only in line 502.

It is such rectangles that Cullen rotates to correct skew. Accordingly, Cullen does not preserve text at all during skew correction. Cullen is about defining blocks of text and blocks

of images as an aid to subsequent character recognition. The rectangles deskewed by Cullen do not contain actual text and certainly are not about finding characters which bridge adjacent blocks.

In discussing skew Cullen states: "In any event, each rectangle is the boundary of a set of connecting patterns (pixels) that form a word or a letter." (col. 13, lines 31-33). This teaches the opposite of finding characters which bridge adjoining bocks. Thus, Cullen does not suggest locating characters which bridge adjoining blocks for purposes of correcting skew.

The rejection applies the Kamitani reference for identifying adjoining text characters and associating each character with a respective portion. However, Kamitani is to segmentation of a character from a string of characters which are in touch with each other. Kamitani does not associate characters to anything at all similar to blocks since Kamitani is about segmenting [separating] characters. The parts of Kamitani cited in the rejection say nothing about associating the segment characters.

The desirability is not recognized in any of the references of deskewing a character partially in one deskew block based on the deskew factor of another block so that a character is not distorted by being partly deskewed in one amount and partly deskewed in another amount.

In summary, the reliance on Cullen and Kamitani in this rejection of claims 2, 5-6, 15 and 17-19 is not supported as all of the claims require an identification of characters that bridge adjoining blocks. Cullen clearly operates to locate locations between characters and the Kamitani teaching of segmenting characters could not cure this deficiency. In addition, reliance on Yoshida with respect to claim 6 as teaching continuous tone data and bytemaps is not supported as discussed in the foregoing.

Rejection of Claims 11 and 12 as Obvious

Claims 11-12 are rejected as obvious over Yoshida in view of Cullen and the Saund reference. Yoshida is cited for correcting skew in continuous tone data. Cullen is cited for

identifying text characters and correcting skew by shifting individual blocks. Saund is cited for de-warping image data, which is applied as teaching shifting a minority portion of the text character located in an adjacent block not present in the associated block by an amount corresponding to a difference between a skew correction factor corresponding to the associated block and a skew correction factor corresponding to the adjacent block.

The rejection of claims 11, an independent claim, applies Yoshida as receiving continuous tone data, for generating a plurality of bytemaps. For the reasons discussed in the foregoing with respect to claim 4, Yoshida does not disclose continuous tone data or generating a plurality of bytemaps. No issue is taken with the other characterizations of Yoshida with respect to claim 11.

This rejection also cites column 14, lines 51-57 of Cullen for inherent skew correction if a text character bridges a block boundary. In response, however, it is respectfully pointed out that column 14, lines 51-57 in no way discuss rotation of part of a rectangle, and the rectangles of Cullen do not bridge characters. More fundamentally, if a character bridges two rectangles in Cullen (which Cullen does not teach), then independent rotation of the two blocks which bridge a character typically would rotate different parts of the character different amounts. That is the problem claim 11 solves. Thus, this application of Cullen teaches away from claim 11.

The rejection finds with respect to Cullen that the use of a vertical centerline instead of a rectangle is old and well known. However, as discussed fully in the foregoing with respect to claims 2, 5, 6, 15 and 17-19, Cullen does not identify any text which bridges adjoining blocks. Accordingly, it could not suggest finding the centerline of such text.

Finally, Saund is cited for shifting a minority portion of each text character. In response, however, Saund is about observing text from pages of a bound document. It employs information about the document shape to de-warp. The de-warping is of the overall image

observed, not individual characters. This does could not at all suggest deskewing by associating a text character with an image block as claimed.

With respect to claim 12, Yoshida is cited for applying a halftone screen. As discussed fully in the foregoing with respect to the rejection of claims 1, 4 9 and 14, Yoshida does not teach a halftone screen.

The desirability is not recognized in any of the references of deskewing a character partially in one deskew block based on the deskew factor of another block so that a character is not distorted by being partly deskewed in one amount and partly deskewed in another amount.

In accordance with the foregoing, it is respectfully requested that all of the rejected claims be allowed.

Respectfully submitted,

Brian Wesley Damon et al.

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CLAIMS APPENDIX

IN THE CLAIMS

1. A method for reducing the occurrence of print artifacts in an imaging machine, comprising the steps of:

applying electronic printhead skew correction to image data corresponding to at least one of a plurality of image planes to generate skew corrected image data; and

applying an associated halftone screen to said skew corrected image to reduce distortion which would be introduced by the use of said associated halftone screen prior to said electronic printhead skew correction.

2. The method of claim 1, further comprising the steps of:

adding text characters to said skew corrected image data to form a composite bit map;

dividing said composite bit map into a plurality of blocks;

identifying text characters which bridge adjoining of said blocks;

associating said identified text characters with a respective one of said plurality of blocks; and

shifting an entirety of said each of said identified text characters by a skew correction factor associated with said respective one of said plurality of blocks.

4. A method for reducing the occurrence of print artifacts in an imaging machine, comprising the steps of:

determining which of a plurality of printheads units require printhead skew correction;

receiving continuous tone data to be printed;

generating from said continuous tone data a plurality of image bytemaps, each of said plurality of image bytemaps corresponding to a respective one of a plurality of image planes and to a respective one of said plurality of printheads;

applying electronic printhead skew correction to each image bytemap associated with a printhead unit requiring printhead skew correction to generate a corresponding skew corrected image bytemap;

applying an associated halftone screen to each of said corresponding skew corrected image bytemap and to each of said plurality of image bytemaps not receiving application of electronic printhead skew correction to form corresponding halftoned image data; and

serializing each of said corresponding halftoned image data to a respective one of said plurality of printhead units.

5. The method of claim 4, wherein prior to the step of applying an associated halftone screen, said method further comprising the steps of:

adding text characters to at least one of said plurality of image bytemaps to generate at least one composite bytemap;

dividing said composite bytemap into a plurality of blocks;

identifying text characters which bridge adjoining of said blocks;

associating said identified text characters with a respective one of said plurality of blocks; and

shifting an entirety of each of said identified text characters by a skew correction factor associated with said respective one of said plurality of blocks.

6. A method for reducing the occurrence of print artifacts in an imaging machine, comprising the steps of:

determining which of a plurality of printheads units require printhead skew correction;

receiving continuous tone data to be printed;

generating from said continuous tone data a plurality of image bytemaps, each of said plurality of image bytemaps corresponding to a respective one of a plurality of image planes and to a respective one of said plurality of printheads, and wherein at least one of said plurality of image bytemaps includes text characters and said at least one of said plurality of image bytemaps corresponds to a printhead which requires printhead skew correction;

dividing each of said plurality of image bytemaps into a plurality of blocks;

assigning a skew correction factor to each of said plurality of blocks;

identifying characters which bridge adjoining of said blocks;

associating each of said identified text characters with a respective one of said plurality of blocks; and

shifting an entirety of each of said identified text characters by said skew correction factor associated with said respective one of said plurality of blocks.

9. A method for reducing the occurrence of print artifacts in an imaging machine, comprising the steps of:

determining which of a plurality of printheads units require printhead skew correction;

receiving continuous tone data to be printed;

generating from said continuous tone data a plurality of image bytemaps, each of said plurality of image bytemaps corresponding to a respective one of a plurality of image planes and to a respective one of said plurality of printheads;

establishing at least one halftone screen; and

for each of said plurality of image planes associated with a printhead requiring printhead skew correction,

shifting a starting point of application of said at least one halftone screen to the corresponding image bytemap in a direction opposite to and of a magnitude equal to a shift direction and shift magnitude of an electronic printhead skew correction which is to be applied,

applying said at least one halftone screen to said corresponding image bytemap,

applying said electronic printhead skew correction to the halftoned image bytemap of the first applying step, and

serializing the halftoned image bytemap of the second applying step to the respective one of said plurality of printhead units.

11. A method for reducing the occurrence of print artifacts in an imaging machine, comprising the steps of:

determining which of a plurality of printheads units require printhead skew correction;

receiving continuous tone data to be printed;

generating from said continuous tone data a plurality of image bytemaps, each of said plurality of image bytemaps corresponding to a respective one of a plurality of image planes and to a respective one of said plurality of printheads, and wherein at least one of said plurality of image bytemaps includes text characters and said at least one of said plurality of image bytemaps corresponds to a printhead which requires printhead skew correction;

dividing each of said plurality of image bytemaps into a plurality of blocks;

assigning a skew correction factor to each of said plurality of blocks;

identifying a vertical centerline of each of said text characters;

associating said vertical centerline of said each of said text characters with a respective one of said plurality of blocks;

wherein for each text character bridging a block boundary between an associated block and an adjacent block, performing the step of shifting a minority portion of said each text

character located in said adjacent block not present in said associated block by an amount corresponding to a difference between a skew correction factor corresponding to said associated block and a skew correction factor corresponding to said adjacent block; and

after said step of shifting, applying electronic printhead skew correction to each image bytemap associated with each said printhead unit which requires said printhead skew correction.

12. The method of claim 11, further comprising the step of applying a halftone screen to said plurality of image bytemaps after the step of applying electronic printhead skew correction.

14. A method for reducing the occurrence of print artifacts in an imaging machine, comprising the steps of:

applying an associated, pre-compensated halftone screen to image data corresponding to at least one of a plurality of image planes to reduce halftone noise introduced by an electronic printhead skew correction; and

applying said electronic skew correction to data resulting from said applying said pre - compensated halftone screen.

15. The method of claim 14, further comprising the steps of:

adding text characters to said skew corrected image data to form a composite bit map;

dividing said composite bit map into a plurality of blocks;

identifying text characters which bridge adjoining of said blocks;

associating said vertical centerline of said each of said identified text characters with a respective one of said plurality of blocks; and

shifting an entirety of said each of said identified text characters by a skew correction factor associated with said respective one of said plurality of blocks.

17. The method of claim 2 in which said shifting is of a minority portion of each text character located in adjoining of said blocks.

18. The method of claim 5 in which said shifting is of a minority portion of each text character located in adjoining of said blocks.

19. The method of claim 6 in which said shifting is of a minority portion of each text character located in adjoining of said blocks